

Risk Management Financial Distress Prediction and Earnings Management in Indonesian Banks

Suhendra^{1*}, Limajatini², Marta Rodriguez³, Maulana Arif Komara⁴

^{1,2}Faculty of Economics and Business, Universitas Buddhi Dharma, Indonesia

³Department of Management, Eduaward Incorporation, Singapore

⁴Faculty of Economics and Business, Universitas Raharja, Indonesia

¹suhendraubd@gmail.com, ²limajatini@buddhidharma.ac.id, ³m.rodriguezz@eduaward.co.uk

⁴maulana.arif@raharja.info

*Corresponding Author

Article Info

Article history:

Submission April 30, 2026

Revised July 13, 2026

Accepted July 28, 2026

Published August 24, 2026

Keywords:

Risk Management
Financial Distress
Earnings Management
Operational Risk
Commercial Banks



ABSTRACT

The risks faced by financial institutions, particularly banks, can influence financial performance, institutional stability, and managerial reporting behavior. As financial intermediaries and key institutions supporting economic growth, banks require effective risk management to maintain financial resilience. **This study aims to** examine the relationship between bank risk management, financial distress prediction, and earnings management practices in commercial banks listed on the Indonesia Stock Exchange. The study covers the 2019–2022 period, including pre-pandemic conditions, the COVID-19 disruption, and the early recovery phase. **Using a quantitative** approach with panel data regression analysis supported by EViews software, this study analyzes 27 commercial banks selected through purposive sampling based on complete annual report data. Bank risk management is represented by credit risk, market risk, liquidity risk, and operational risk, while financial distress and earnings management are measured using established financial models. **The results show** that credit risk does not significantly affect financial distress or earnings management. Market risk significantly affects earnings management but does not influence financial distress. Liquidity risk and operational risk significantly affect both financial distress and earnings management, while financial distress significantly influences earnings management. **These findings highlight** that liquidity and operational efficiency are important indicators for banking risk control, early warning systems, and transparent financial governance in Indonesian listed banks.

This is an open access article under the [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/) license.



*Corresponding Author:

DOI: <https://doi.org/10.33050/atm.v10i3.2655>

This is an open-access article under the CC-BY-SA license (<https://creativecommons.org/licenses/by-sa/4.0/>)

©Authors retain all copyrights

1. INTRODUCTION

Companies with declining financial performance may face financial distress, which can ultimately lead to bankruptcy if it is not detected early. Therefore, a financial distress prediction model is needed to support early identification and preventive decision-making. Previous studies have examined financial distress prediction using financial ratios, firm size, and crisis-related conditions. However, limited studies have integrated specific banking risk indicators, financial distress prediction, and earnings management in Indonesian

listed banks, especially during the 2019–2022 period [1, 2].

Commercial banks were selected as the research object because they play a central role in financial intermediation, credit distribution, payment systems, and economic stability. Compared with other financial institutions, banks have stronger exposure to credit risk, liquidity risk, market risk, and operational risk due to their reliance on public funds, lending activities, and regulatory supervision. These risks may affect financial performance and encourage earnings management practices, particularly when financial stability is under pressure. Moreover, financial distress can reduce investor confidence and motivate managers to adjust reported earnings to maintain firm value and stakeholder perceptions. Therefore, understanding the relationship between banking risks, financial distress, and earnings management is important in explaining managerial reporting behavior in Indonesian commercial banks [3–5].

Bank risk factors are considered important determinants of earnings management practices. In the banking sector, credit risk measured by Non-Performing Loans (NPL), market risk, liquidity risk, and operational risk may influence financial performance and managerial reporting behavior, particularly during periods of financial pressure. Credit risk reflects loan quality, liquidity risk relates to the ability to meet obligations, market risk arises from changes in market conditions, and operational risk results from weaknesses in internal processes, systems, or human factors. These risks may increase incentives for earnings management when financial stability is threatened. Therefore, this study aims to examine how bank risk factors influence earnings management and financial distress prediction in commercial banks listed on the Indonesia Stock Exchange [6–8].

The research gap is particularly relevant during the 2019–2022 period, which includes pre-pandemic conditions, the COVID-19 disruption, and the early recovery phase, causing changes in credit quality, liquidity pressure, operational efficiency, and market uncertainty in Indonesian banks. This study contributes a novel integrated framework connecting risk management, financial distress prediction, and earnings management by examining four banking risk indicators: credit risk, market risk, liquidity risk, and operational risk. Unlike previous studies focusing on general financial ratios, firm characteristics, or crisis conditions, this study also investigates how financial distress influences earnings management practices while supporting SDGs 8, 9, and 16 through sustainable economic growth, resilient financial infrastructure, and transparent banking governance [9–12].

2. LITERATURE REVIEW

Before developing the hypotheses, this study presents a research framework to clarify the relationship among the main variables [13]. As shown in Figure 1, bank risk management is represented by four indicators, namely credit risk, market risk, liquidity risk, and operational risk. These risk indicators are expected to influence financial distress and earnings management. Furthermore, financial distress is positioned as an important factor that may encourage earnings management practices. Leverage and firm size are included as control variables to strengthen the analysis of earnings management in Indonesian commercial banks.

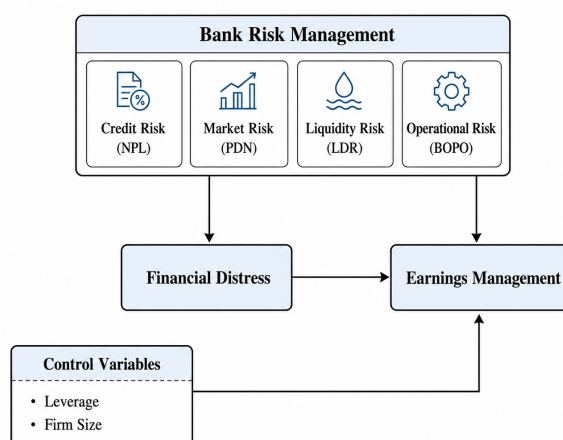


Figure 1. Research Framework of Bank Risk Management, Financial Distress and Earnings Management

The conceptual relationship between bank risk management, financial hardship, and earnings management in Indonesian commercial banks is depicted in Figure 1. The four primary indications of bank risk management are NPL, market risk (PDN), liquidity risk (LDR), and operational risk (BOPO). Because deficiencies in credit quality, market exposure, liquidity capacity, and operational efficiency may lower bank financial stability, these risk indicators are anticipated to have an impact on financial distress. The approach also demonstrates that since managerial discretion in financial reporting can be influenced by financial pressure and risk exposure, bank risk management may have a direct impact on earnings management. Furthermore, financial hardship is presented as a significant element that could promote earnings management strategies. To give a more thorough explanation of earnings management practices in Indonesian listed banks, leverage and firm size are added as control variables [14, 15].

2.1. The Influence of Bank Risk on Financial Distress

Because banks are essential to sustaining economic activity, risk considerations are inherent in the banking industry. If these risks are not adequately handled, they could have a substantial impact on the financial health of banks and cause financial hardship [16]. Prior research has demonstrated a strong correlation between commercial banks' financial stability and risk management strategies. Furthermore, controlling foreign exchange risk and other financial factors can enhance the forecasting of financial challenges and facilitate prompt restructuring choices for organizations under financial strain [17, 18]. Businesses that are struggling financially might need to quickly restructure troublesome debts in order to continue operating. Credit risk, liquidity risk, market risk, and operational risk are the only bank risks this study looks at. As a result, the following theories are put forth:

- H1: Credit risk (NPL) has a positive effect on financial distress.
- H2: Market risk (PDN) has a positive effect on financial distress.
- H3: Liquidity risk (LDR) has a positive effect on financial distress.
- H4: Operational risk (BOPO) has a positive effect on financial distress.

2.2. Influence of Bank Risks on Earnings Management

Banks are exposed to various risks that can ultimately affect their income and financial performance [19]. When profits fall below the expected target, management may have incentives to implement earnings management strategies. Previous studies have shown that bank risk is associated with discretionary accruals, indicating that reported earnings may not always fully reflect the actual financial condition of the bank. In addition, earnings management can be related to operational risk, loan loss provisions, and changes in banking crisis conditions. Therefore, bank risk factors are important to examine because they may influence managerial reporting behavior and the quality of earnings information.

Bank risks that wish to be studied further are limited to credit risk, liquidity risk, market risk, and operational risk [20, 21]. Based on this explanation, the hypotheses proposed are:

- H5: Credit Risk (NPL) has a positive effect on earnings management.
- H6: Market risk (PDN) has a positive effect on earnings management.
- H7: Liquidity risk (LDR) has a positive effect on earnings management.
- H8: Operational risk (BOPO) has a positive effect on earnings management.

2.3. The Effect of Financial Distress on Earnings Management

Financial distress is a state in which a business faces financial strain that, if improperly handled, could ultimately result in bankruptcy. When a business can't pay its debts, it files for bankruptcy [22]. Financial difficulties typically manifest prior to bankruptcy and may put pressure on management to preserve the company's continuity and reputation. In these situations, management might be more motivated to manipulate earnings in order to show better financial results [23, 24]. In reaction to deteriorating performance, investor concerns, and the need to preserve stakeholder confidence, companies under financial strain are more likely to modify reported earnings. In light of this reasoning, the following hypothesis is put forth:

- H9: Financial distress has a positive effect on earnings management.

3. RESEARCH METHODOLOGY

3.1. Sample Selection

Every commercial bank that is listed on the Indonesia Stock Exchange is examined in this study. Purposive sampling was used to choose the sample based on particular standards pertinent to the study's goals. 27 of the 43 commercial banks in total satisfied the sample requirements and were taken into consideration for the analysis [25]. In order to measure risk management, financial distress, and earnings management throughout the 2019–2022 period, the selection criteria were established to guarantee that every bank had comprehensive and consistent annual report data.

- Has an annual report that is published periodically from the 2019-2022 period in full.
- The data available in the annual report completely provides the data needed for this research.
- Companies that publish annual reports in rupiah.

3.2. Variable Measurement

The variables in this research consist of two dependent variables, namely earnings management. Meanwhile, the independent variables are risk management and financial distress, intervening variables, with company size leverage as the control variable [26, 27].

3.2.1. Credit Risk

Credit risk can be measured by NPL, namely the ratio of NPL [28]. Credit disbursed is considered problematic when repayment is delayed beyond the planned schedule or when the loan is not repaid at all [29, 30]. In this study, credit risk is measured using the NPL ratio, which is calculated using the following formula:

$$NPL = \frac{\text{volume of non-performing loans}}{\text{total loans}}$$

3.2.2. Market Risk

Market risk refers to the potential loss arising from changes in market factors that may reduce market prices and negatively affect the bank's portfolio [31]. In this study, market risk is measured using Posisi Devisa Neto (PDN), or Net Open Position, which reflects the net difference between foreign currency assets and liabilities after considering administrative accounts. Market risk is measured using the following formula:

PDN = Net difference between assets and liabilities in foreign currency after taking into account administrative accounts

3.3. Liquidity Risk

According to the Indonesian Bankers Association (2012), managing liquidity risk is crucial because it can have a significant impact. In certain instances, banks collapse because they are unable to meet their liquidity needs. The LDR can be used to calculate liquidity risk using the following formula:

$$LDR = \frac{\text{total loans}}{\text{total third-party funds}}$$

3.3.1. Operational Risk

The risk resulting from insufficient or unsuccessful internal procedures, human error, system malfunctions, or outside circumstances that could impact a bank's operational performance is referred to as operational risk [32, 33]. The BOPO ratio, which contrasts operational expenses with operational income, is used in this study to quantify operational risk. A higher BOPO ratio may be a sign of increased operational risk inside the bank as well as decreased operational efficiency.

$$BOPO = \frac{\text{operating expenses}}{\text{operating revenue}}$$

3.3.2. Leverage

The percentage of debt utilized in a company's capital structure is known as financial leverage [34]. Because the business has more responsibilities to meet, a higher debt level may raise financial risk. However, when borrowed money is managed wisely and produces returns greater than financing expenses, debt can also assist business operations [35]. The debt-to-equity ratio, which contrasts total debt with total equity, is used in this study to calculate Leverage. The following formula is used to get the debt-to-equity ratio:

$$Leverage = \frac{\text{total debt}}{\text{total equity}}$$

3.3.3. Firm Size

Firm size can be measured in a number of ways, one of which is the company's total assets [36]. The company's size is determined by the size of its assets, which are calculated as the logarithm of its total assets. The following formula can be used to determine firm size, or company size:

$$\text{Firm Size} = \ln \text{Total Assets}$$

3.3.4. Financial Distress

A decline in a company's financial situation prior to bankruptcy or liquidation is referred to as financial hardship [37]. The Altman Z-score approach, which evaluates a company's possible financial strain by combining multiple financial indicators, is used in this study to predict financial difficulty [38]. A higher Z-score denotes greater financial stability, whereas a lower Z-score suggests a greater likelihood of financial difficulty. The following formula is used to determine the financial hardship score:

$$Z = X1 + X2 + X3 + X4$$

Information:

- Z = Z-Score Index.
- $X1$ = Loan / Deposit Ratio.
- $X2$ = Retained Earnings / Total Assets.
- $X3$ = Earnings Before Interest and Tax / Total Assets.
- $X4$ = Market Value of Equity to Book Value of Total Debt.

3.3.5. Earnings management

The term "earnings management" describes administrative involvement in the financial reporting process that could affect the data shown in financial statements [39]. Discretionary accruals, which represent the portion of accruals that may result from managerial discretion, are used in this study to measure earnings management [40]. The degree to which management may modify reported results through accrual-based accounting decisions is determined using the discretionary accruals model [41]. The model is expressed as follows:

$$TA_{it} = \beta_0 + \beta_1 Co_{it} + \beta_2 Loan_{it} + \beta_3 NPA_{it} + \beta_4 \Delta NPA_{it+1} + e_{it}$$

Information:

- TA_{it} = Total Accruals.
- Co_i = Credit written off (loans charge-offs) is reflected in the collateral taken over, with the consideration that the collateral eliminates the bad credit by handing over the collateral.
- $Loan_{it}$ = Loans outstanding (loans in circulation).
- NPA_{it} = Non-performing assets (problematic productive assets) based on current, substandard, doubtful, and loss collectibility.
- ΔNPA_{it+1} = Difference between non-performing assets in the next year and non-performing assets t.
-

$$NDA_{it} = TA - (\beta_0 + \beta_1 Co_{it} + \beta_2 Loan_{it} + \beta_3 NPA_{it} + \beta_4 \Delta NPA_{it+1})$$

•

$$DA_{it} = TA_{it} - NDA_{it}$$

Information:

TA_{it} is the total accrual calculated by the balance of the allowance for possible losses on productive assets (PPAP), NDA_{it} is the non-discretionary, and DA_{it} is discretionary accrual (discretionary accrual).

3.4. Research Model

The analytical method used in this research is panel data regression analysis using the EViews program [42]. The regression equation model in this research is as follows:

$$Z = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

Information:

- Y = Earnings Management.
- Z = Financial Distress.
- X_1 = Credit Risk.
- X_2 = Market Risk.
- X_3 = Liquidity Risk.
- X_4 = Operational Risk.
- X_5 = Leverage.
- X_6 = Firm Size.
- b_0 = Constant.
- b = Regression Coefficient.
- e = Error term (Error).

The common effect model, fixed effect model, and random effect model are the three model estimation alternatives available for panel data analysis using EViews [43, 44]. To get the best panel regression estimation, a methodical model selection approach was carried out. The common effect model and the fixed effect model were first compared using the Chow test [45]. The fixed effect model was seen to be more suitable if the Chow test result revealed a substantial probability value since it could account for variations in features among banks [46, 47].

However, as individual differences between banks were not statistically significant, the common effect model was used if the outcome was not significant. Second, the fixed effect model and the random effect model were compared using the Hausman test when the fixed effect model was favored. While a non-significant result favored the employment of the random effect model, a significant Hausman test result suggested that the fixed effect model was more appropriate [48, 49]. These model selection processes led to the selection of the fixed effect model for the earnings management model and the common effect model for the financial distress model. Since large individual bank effects were not necessary for the estimation, the common effect model was suitable for Model 1 [50, 51]. The fixed effect model, on the other hand, was suitable for Model 2 since different banks may have different earnings management practices because of variations in internal policies, operational structure, governance quality, and managerial discretion. To make sure the regression assumptions were met, a number of preparatory tests, including as normality, autocorrelation, multicollinearity, and heteroscedasticity tests, were carried out before to panel regression analysis [52, 53].

4. RESULTS AND DISCUSSION

Purposive sampling was used in this study, which focused on commercial banks that were listed on the Indonesia Stock Exchange. For the 2019–2022 period, a total of 27 banks satisfied the sample requirements, yielding 108 firm-year observations. The yearly financial reports released by Bank Indonesia and the Indonesia Stock Exchange provided the research data. Table 1 displays the research variables' descriptive statistics. Purposive sampling was used to select banks that were listed on the Indonesia Stock Exchange for this study. For the years 2019–2022, 27 businesses satisfied the requirements. The IDX and Bank Indonesia's firm financial reports provided the research data. The following is a description of this data.

Table 1. Descriptive Statistics (N=108)

Variable	Min	Max	Mean	Std. Dev
Credit Risk	0.02	12.28	2.57	2.10
Market Risk	0.00	13.65	2.31	2.48
Liquidity Risk	0.68	108.86	84.72	12.83
Operational Risk	0.79	173.80	82.42	20.32
Leverage	2.96	18.21	7.77	2.70
Firm Size	15.06	20.59	17.54	1.65
Earnings Management	-0.45	1.26	0.67	0.31
Financial Distress	0.65	2.15	1.02	0.19

Table 1 presents the descriptive statistics of 108 observations from Indonesian listed commercial banks during the 2019–2022 period. The results show that liquidity risk has the highest mean value at 84.72, followed by operational risk at 82.42, indicating that liquidity management and operational efficiency are important issues in the banking sector. Meanwhile, credit risk and market risk have relatively low mean values of 2.57 and 2.31, suggesting that these risks were generally controlled during the observation period. The average financial distress value of 1.02 indicates that banks still faced potential financial pressure, while the mean earnings management value of 0.67 shows the presence of managerial discretion in financial reporting.

4.1. Hypothesis testing

With the use of EViews software, two panel data regression models were used for data analysis. The fixed effect model was chosen for Model 2 and the common effect model for Model 1 based on the model selection process. The best estimation model for each regression equation was chosen using the Chow and Hausman tests. Because the test results showed that individual bank effects were not statistically significant in explaining financial distress, the common effect model was deemed suitable for Model 1. On the other hand, Model 2's fixed effect model was chosen because the findings indicated that bank-specific factors had to be taken into account while analyzing earnings management. As a result, the chosen models were thought to be appropriate for examining the connection between financial distress, earnings management, and bank risk indicators. Table 2, which summarizes the coefficient values, t-statistics, significance levels, and interpretation of each investigated association, displays the findings of the hypothesis testing for both regression models.

Table 2. Hypothesis Test Model 1

Model	Variable	b	T count	Sig	Information
1	Constant	0.688	-	-	-
	Credit Risk	-0.003	-0.415	0.679	No
	Market Risk	-0.003	-0.607	0.545	No
	Liquidity Risk	0.009	8.476	0.000	Significant
	Operational Risk	-0.003	-3.655	0.000	Significant
	Leverage	-0.018	-3.451	0.001	Significant
2	Constant	3.424	-	-	-
	Credit Risk	0.004	0.434	0.665	No
	Market Risk	-0.017	-2.328	0.022	Significant
	Liquidity Risk	0.007	3.419	0.001	Significant
	Operational Risk	-0.002	-1.963	0.050	Significant
	Firm Size	-0.145	-12.759	0.000	Significant
	Financial Distress	-0.530	-3.959	0.000	Significant

The findings of the two panel regression models' hypothesis testing are shown in Table 2. Financial distress is significantly impacted by liquidity risk, operational risk, and leverage in Model 1, but not by credit risk or market risk. Model 2 shows that while credit risk has no discernible impact on earnings management, market risk, liquidity risk, operational risk, company size, and financial hardship do. These findings suggest that the relationship between bank risk management and earnings management in Indonesian listed commercial banks can be explained by liquidity risk, operational risk, and financial hardship.

4.2. The Effect of Credit Risk on Financial Distress

The results of the investigation show that financial suffering is unaffected by credit risk. The significance value of 0.679, which is more than 5%, makes this clear. Financial distress decreases by 0.003 units for every unit increase in credit risk, according to the coefficient value of -0.003. This hypothesis' rejection implies that credit risk, as determined by NPL, is still comparatively low. According to the study, the average NPL value is 2.57, which suggests that this degree of credit risk has no bearing on financial hardship. According to this research, credit risk in Indonesian listed banks was still comparatively controllable between 2019 and 2022, therefore it did not directly cause financial strain that resulted in financial crisis.

This finding deviates from a number of recent research that highlight financial risk as a significant factor influencing managerial decision-making and financial distress, especially in developing market environments. The negligible impact of credit risk on the Indonesian banking industry, however, can be the result of more stringent loan quality evaluations, tighter credit monitoring, and more cautious lending practices during shaky economic times. Therefore, unless there is additional macroeconomic instability, operational inefficiencies, or liquidity pressure, credit risk may not be enough to explain financial crisis.

4.3. The Influence of Market Risk on Financial Distress

The analysis's findings show that financial distress is unaffected by market risk. The significance value of 0.545, which is more than 5%, makes this clear. Financial distress decreases by 0.003 units for every unit rise in market risk, according to the negative relationship indicated by the coefficient value of -0.003. With an average PDN value of 2.308, the research findings indicate that market risk, as determined by PDN, falls into a reasonably low category. Therefore, the likelihood of financial trouble is not greatly increased by this degree of market risk.

4.4. The Influence of Liquidity Risk on Financial Distress

The results show that financial distress is positively impacted by liquidity risk. A significance level of 0.000, which is less than the 5% criterion, supports this. A coefficient of 0.009 further illustrates the relationship between these two parameters. This coefficient indicates a one-way relationship, meaning that a drop of 0.009 units in financial hardship is correlated with an increase of one unit in liquidity risk. Liquidity risk, as determined by the loan-to-deposit ratio, which shows the relationship between the amount of credit given and the money received from outside sources, is the basis for this hypothesis' confirmation. As a result, when the total credit amount exceeds the funds obtained from outside sources, there is a greater chance that the business will have trouble meeting its commitments, which raises the risk of financial failures in the banking sector.

Because banks must maintain a balance between credit distribution and third-party funds, this finding is consistent with recent research demonstrating that liquidity pressure is a critical factor in banking stability. The COVID-19 pandemic and an early economic recovery created a difficult operating environment for Indonesian commercial banks between 2019 and 2022, which could increase liquidity strain and make it more difficult for banks to fulfill short-term obligations. LDR is a crucial early warning indicator for spotting possible financial issues in Indonesian listed banks, as evidenced by the substantial impact of liquidity risk on financial distress.

4.5. The Influence of Operational Risk on Financial Distress

The analysis's findings show that operational risk negatively affects financial distress. The significance value of 0.000, which is less than 5%, makes this clear. A one-unit rise in operational risk results in a 0.003-unit drop in financial hardship, according to the coefficient value of -0.003, which indicates an inverse association between the two variables. Banks can lessen this risk by increasing operational effectiveness to improve customer loyalty and service quality, which will ultimately increase revenue and lower the chance of financial difficulties.

4.6. The Influence of Credit Risk on Earnings Management

The analysis's conclusions show that credit risk has little bearing on how earnings are managed. The significance value, which is measured at 0.665 and surpasses 5%, supports this conclusion. The coefficient value of 0.004 further demonstrates the link between these two variables. According to this coefficient, there is only a 0.004 unit rise in the profits management variable for every unit increase in the credit risk variable, indicating a unidirectional link. The fact that credit risk, as measured by NPL, is still in the relatively low range could be the reason for this hypothesis' rejection. The average NPL value, according to the research findings, is 2.573. It is implied that banks do not participate in profit management depending on the credit risk they experience because such a level of credit risk does not result in a significant loss in bank profitability.

4.7. The Influence of Market Risk on Earnings Management

Market risk has a detrimental effect on earnings management, according to the analysis's conclusions. The significance value of 0.022, which is less than 5%, makes this clear. The direction of the link between these variables is indicated by the coefficient value of -0.017, which indicates an inverse correlation. Consequently, earnings management falls by 0.017 units for every unit rise in market risk. The idea that different degrees of market risk affect the company's potential to generate profits and motivate management to put plans in place to improve profitability lends credence to the concept.

4.8. The Influence of Liquidity Risk on Earnings Management

The results show that managing earnings is positively impacted by liquidity risk. The statistically significant result of 0.001, which is less than 5%, makes this clear. The coefficient value of 0.007, which shows a positive correlation, illustrates the association between these two variables. In particular, earnings management increases by 0.007 units for every unit increase in liquidity risk. The loan-to-deposits ratio, which measures the balance between credit extended and third-party funds, provides support for the hypothesis.

An increase in credit extended is expected to boost the bank's income. Therefore, if the bank's income does not align with the total credit extended, it may prompt management to manipulate profits by increasing the nominal amount. This finding is in line with recent studies indicating that liquidity-related indicators can influence earnings management behavior in the banking sector. When banks face liquidity pressure or when income generated from credit distribution does not match expected performance, management may have stronger incentives to adjust reported earnings to maintain stakeholder confidence. This finding implies that, in the context of Indonesian commercial banks from 2019 to 2022, liquidity risk may have an impact on managerial discretion in financial reporting in addition to financial stability, especially during uncertain and recovering economic times.

4.9. The Influence of Operational Risk on Earnings Management

The analysis's findings show that operational risk has a negative effect on earnings management. A significance value of 0.050, which is less than the 5% cutoff, demonstrates this. An inverse association between these two variables is further demonstrated by a coefficient value of -0.002, which means that an increase of one unit in operational risk corresponds to a decrease of 0.002 units in profits management. Although it also reflects the company's inefficiency, this reduction may be the result of the bank's high operating costs, which might be used to improve facilities, services, and the skill of human resource management. This result implies that a decrease in operational risk is linked to a decrease in operational expenses in relation to operational revenue, which is an important factor for businesses that control their profitability.

4.10. The Effect of Financial Distress on Earnings Management

A significance value of 0.000 and a coefficient value of -0.530 in the analysis reveal that financial distress has a negative impact on earnings management. This suggests that earnings management in Indonesian commercial banks is significantly correlated negatively with financial crisis. Financial distress typically precedes bankruptcy and can put pressure on management to preserve business continuity, investor trust, and a favorable financial reputation. In such circumstances, management might be more motivated to respond to financial pressure by using discretionary reporting procedures. Consequently, our result demonstrates that managerial reporting behavior can still be explained by financial strain, particularly in times of economic uncertainty.

This finding also strengthens the relevance of banking risk management in the fintech and digital banking era. Banks need to strengthen digital risk governance, internal control systems, and technology-supported

early warning mechanisms to detect potential financial distress and reduce earnings management practices. In practice, indicators such as LDR, BOPO, and financial distress scores can be integrated into digital risk dashboards to monitor liquidity pressure, operational efficiency, and financial stability. These findings also support SDG 8 by promoting financial stability and sustainable economic growth, SDG 9 by encouraging technology-based early warning systems and resilient digital banking infrastructure, and SDG 16 by promoting transparent governance, responsible financial reporting, and stronger institutional accountability. Overall, liquidity risk, operational risk, and financial distress are more sensitive indicators in explaining earnings management than credit risk and market risk in Indonesian listed banks.

5. MANAGERIAL IMPLICATIONS

The findings of this study provide important managerial implications for Indonesian commercial banks in reducing financial distress and preventing earnings management practices. First, banking managers should give greater attention to liquidity risk because the results show that liquidity risk significantly affects both financial distress and earnings management. Banks can manage this risk by regularly monitoring the Loan to Deposit Ratio, maintaining sufficient liquid assets, balancing credit expansion with third-party funds, and ensuring that short-term obligations can be fulfilled properly. Effective liquidity planning can help banks detect early signs of financial pressure and reduce the need for managerial intervention in reported earnings.

Second, banks should improve operational efficiency because operational risk also has a significant influence on financial distress and earnings management. Managers need to control the BOPO ratio by reducing unnecessary operational costs, improving service processes, strengthening digital banking operations, and increasing the effectiveness of internal procedures. Operational efficiency is important because inefficient cost structures may weaken profitability and increase financial vulnerability. By improving operational performance, banks can maintain financial stability and reduce incentives for earnings management.

Third, banking managers should develop a technology-supported early warning system that integrates key indicators such as LDR, BOPO, financial distress scores, and earnings management signals. This system can help management identify potential financial problems before they become more serious. In the fintech and digital banking era, early warning systems should also be supported by digital risk governance, internal control, audit quality, and transparent financial reporting. These managerial actions can strengthen bank resilience, improve stakeholder confidence, and support responsible financial practices in Indonesian listed banks.

6. CONCLUSION

The findings of this study indicate that bank risk management has different effects on financial distress and earnings management in Indonesian commercial banks. Credit risk does not significantly affect financial distress or earnings management, suggesting that Indonesian banks have implemented relatively cautious credit policies and maintained controlled non-performing loan conditions. Market risk also does not significantly affect financial distress, indicating that banks may have anticipated market changes effectively to maintain financial stability. However, market risk negatively affects earnings management, showing that market conditions can still influence managerial reporting behavior. Liquidity risk has a significant effect on both financial distress and earnings management, highlighting the important role of liquidity in maintaining banking financial health. Operational risk also significantly affects financial distress and earnings management, indicating that operational efficiency is an essential factor in maintaining bank performance. In addition, financial distress has a significant effect on earnings management, showing that declining financial conditions may encourage managerial discretion in financial reporting.

In light of these findings, several recommendations and practical implications are proposed for commercial banks, regulators, and investors. Commercial banks should not only focus on credit risk, market risk, liquidity risk, and operational risk, but also consider broader risks identified in regulatory guidelines when forecasting financial distress. In the fintech and digital banking era, this recommendation becomes increasingly important because digital transactions, online banking services, mobile financial platforms, and fintech collaborations may create additional liquidity, operational, cybersecurity, data privacy, and governance risks. Therefore, commercial banks need to strengthen technology-supported risk monitoring, internal control systems, and early warning mechanisms to detect potential financial distress and reduce the possibility of earnings management practices. Banking managers should use LDR, BOPO, and financial distress indicators as early warning signals to strengthen liquidity planning, improve operational efficiency, and reduce incentives for

earnings management. Regulators can use these findings to strengthen supervision over bank risk governance, digital banking risk, and financial reporting transparency, while investors can consider liquidity risk, operational efficiency, and financial distress indicators when assessing bank performance, financial stability, and the reliability of reported earnings.

These findings also have implications for the Sustainable Development Goals. The study supports SDG 8 by showing that effective banking risk management can help maintain financial stability, business continuity, and sustainable economic growth. It supports SDG 9 by emphasizing the importance of technology-supported early warning systems, digital banking innovation, and resilient financial infrastructure. It also supports SDG 16 by encouraging transparent banking governance, responsible financial reporting, stronger internal control, and institutional accountability to reduce earnings management practices. However, this research is limited to commercial banks listed on the IDX over the 2019–2022 period, so the results may not fully capture long-term banking risk patterns beyond pre-pandemic, pandemic, and early recovery conditions. The sample is also limited to listed commercial banks and may not represent non-listed banks, rural banks, Islamic banks, or other financial institutions. Future researchers are encouraged to extend the observation period, expand the sample scope, and include external macroeconomic, regulatory, digital banking risk, fintech risk, and governance-related variables to provide a more comprehensive understanding of banking risk management in the digital finance era.

7. DECLARATIONS

7.1. About Authors

Suhendra (SS)  <https://orcid.org/0000-0002-7775-2249>

Limajatini (LL)  <https://orcid.org/0009-0000-9692-8599>

Marta Rodriguez (MR)  <https://orcid.org/0009-0000-1367-0511>

Maulana Arif Komara (MK)  <https://orcid.org/0009-0005-8906-3132>

7.2. Author Contributions

Conceptualization: SS and LL; Methodology: MK; Software: LL and SS; Validation: MK and MR; Formal Analysis: SS and MK; Investigation: SS; Resources: LL; Data Curation: MR; Writing Original Draft Preparation: LL and SA; Writing Review and Editing: MR and MK; Visualization: MK. All authors, SS, LL, MR and MK, have read and agreed to the published version of the manuscript.

REFERENCES

- [1] G. Chi and A. R. Gooda, "Internal control, debt risk, ceo education and earnings management evidence from china," *Journal of Financial Reporting and Accounting*, vol. 22, no. 1, pp. 52–78, 2024.
- [2] R. Rarmizi, I. Y. Nasaruddin, N. Hidayah *et al.*, "Analysis of the influence of corporate governance on the financial performance of islamic banks in indonesia 2016-2021," *APTISI Transactions on Management*, vol. 7, no. 2, pp. 179–190, 2023.
- [3] G. Gupta and J. Mahakud, "Impact of financial distress on investment-cash flow sensitivity: evidence from emerging economy," *International Journal of Managerial Finance*, vol. 19, no. 4, pp. 713–743, 2023.
- [4] D. M. Mathuva and M. N. Nyangu, "Revisiting earnings quality and bank efficiency among east african developing economies: do systemic banking and financial crises matter?" *Journal of Applied Accounting Research*, vol. 23, no. 3, pp. 650–685, 2022.
- [5] H. A. Winata and F. Simon, "Influence of profitability, audit quality, and corporate governance on earnings management," *APTISI Transactions on Management*, vol. 8, no. 2, pp. 93–104, 2024.
- [6] A. Mehmood and F. De Luca, "Financial distress prediction in private firms: developing a model for troubled debt restructuring," *Journal of Applied Accounting Research*, vol. 26, no. 6, pp. 205–222, 2025.
- [7] M. Wahyudi, T. A. A. Sandi, W. Bismi, U. Rahardja, L. Pujiastuti *et al.*, "Performance analysis of open shortest path first multiarea using virtual link method," in *2023 11th International Conference on Cyber and IT Service Management (CITSM)*. IEEE, 2023, pp. 1–5.
- [8] S. Suhendra, E. Murwaningsari, and S. Mayangsari, "Derivative on the value relevance through tax avoidance and earnings control. linguistics and culture review, 6, 510–529," 2022.

- [9] D. B. C. Viana Jr, I. Lourenço, and E. L. Black, "Financial distress, earnings management and big 4 auditors in emerging markets," *Accounting Research Journal*, vol. 35, no. 5, pp. 660–675, 2022.
 - [10] M. Wahyudi, W. Bismi, M. Raharjo, U. Rahardja, L. Pujiastuti *et al.*, "Gender recognition based on face image using deep learning method," in *2023 11th International Conference on Cyber and IT Service Management (CITSM)*. IEEE, 2023, pp. 1–6.
 - [11] R. Karina and Y. N. Soenarno, "The impact of financial distress, sustainability report disclosures, and firm size on earnings management in the banking sector of indonesia, malaysia, and thailand," *Accounting and Management Information Systems*, vol. 21, no. 2, pp. 289–309, 2022.
 - [12] N. A. Abu, Z. Kedah, U. Rahardja, B. E. Sibarani, S. Kosasi, S. Dewi, and I. S. Fadli, "Digital ringgit: A new digital currency with traditional attributes," in *2023 11th International Conference on Cyber and IT Service Management (CITSM)*. IEEE, 2023, pp. 1–6.
 - [13] W. I. Almubarak, K. Chebbi, and M. A. Ammer, "Unveiling the connection among esg, earnings management, and financial distress: Insights from an emerging market," *Sustainability*, vol. 15, no. 16, p. 12348, 2023.
 - [14] R. D. Laksana, I. Shaferi, and H. Naznii, "The effect of operational risks for digital banking services at banks," *Jurnal Manajemen Bisnis*, vol. 14, no. 2, pp. 451–468, 2023.
 - [15] K. Diantoro, D. Supriyanti, Y. P. A. Sanjaya, S. Watini *et al.*, "Implications of distributed energy development in blockchain-based institutional environment," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 5, no. 2sp, pp. 209–220, 2023.
 - [16] V. Korneev, O. Dziubliuk, A. Tymkiv, V. Antkiv, and N. Kucherenko, "Banking sector stability and economic development: Assessment of risks and efficiency," *Economic Affairs*, vol. 68, no. 3, pp. 1683–1692, 2023.
 - [17] L. Hamzat, "Real-time financial resilience and debt optimization for entrepreneurs: tackling debt management as a financial health pandemic and empowering small business growth through early detection of financial distress and effortless capital management," *Int J Adv Res Publ Rev*, vol. 2, no. 5, pp. 202–23, 2025.
 - [18] A. Felix and G. D. Rembulan, "Analysis of key factors for improved customer experience, engagement, and loyalty in the e-commerce industry in indonesia," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 5, no. 2sp, pp. 196–208, 2023.
 - [19] R. Mohammad, A. I. Nour, and S. M. Al-Atoot, "Risk and reward: unraveling the link between credit risk, governance and financial performance in banking industry," *Journal of Islamic Marketing*, 2024.
 - [20] M. T. S. Putro, N. H. Rachman, and U. S. Al-Azizah, "The effect of size, market risk, operational risk, liquidity risk, and credit risk on profitability in banks in the kbmi 3 and kbmi 4 categories for the 2017-2021," *INTERNATIONAL JOURNAL OF TRENDS IN ACCOUNTING RESEARCH*, vol. 3, no. 2, pp. 63–73, 2022.
 - [21] A. W. Kusuma, Y. Jumaryadi, A. Fitriani *et al.*, "Examining the joint effects of air quality, socioeconomic factors on indonesian health," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 5, no. 2sp, pp. 186–195, 2023.
 - [22] E. B. Mpora, A. Katabaazi-Bwengye, E. Atukunda, and N. R. Dan, "The effects of financial distress on financial performance: An empirical analysis of smes in sheema, buhweju, rubirizi, and bushenyi districts," *vol.*, vol. 19, pp. 17–27, 2025.
 - [23] R. Arhinful, H. A. Obeng, L. Mensah, and C. C. Mensah, "Signaling sustainability: The impact of sustainable finance on dividend policy among firms listed on the london stock exchange," *Business Strategy and the Environment*, vol. 34, no. 7, pp. 8001–8019, 2025.
 - [24] M. H. R. Chakim, P. A. Sunarya, V. Agarwal, I. N. Hikam *et al.*, "Village tourism empowerment against innovation, economy creative, and social environmental," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 5, no. 2sp, pp. 162–174, 2023.
 - [25] H. K. Ngo and H. T. T. Trinh, "The impact of financial risks on bank performance: evidence from bayesian analysis in vietnam's commercial banks," *Discover Sustainability*, vol. 6, no. 1, p. 515, 2025.
 - [26] A. Alfiana, F. R. Dhanias, L. Judijanto, H. Purnomo, and D. T. Awaludin, "The influence of good corporate governance, tax planning, and financial distress on earnings management with internal control as intervening variable," *INVEST: Jurnal Inovasi Bisnis dan Akuntansi*, vol. 7, no. 1, pp. 222–241, 2026.
 - [27] L. K. Choi, N. Ifitah, and P. Angela, "Developing technopreneur skills to face future challenges," *IAIC Transactions on Sustainable Digital Innovation (ITSDI)*, vol. 5, no. 2, pp. 127–135, 2024.
-

- [28] A. KHOTIMAH, D. Y. MARTIA, C. N. JAMILAH, and A. MAYRANI, "Analyzing the credit risk management and its role in alleviating non-performing loans at pt bank banten," *Prosiding Simposium Nasional Perbankan, Akuntansi Dan Keuangan*, vol. 2, pp. 136–143, 2025.
- [29] P. M. Kariuki, "Multi-borrowing practices and loan repayment of micro and small enterprises in trade sector in meru county, kenya," Ph.D. dissertation, Kenyatta University, 2025.
- [30] Y. Shino, F. Utami, and S. Sukmaningsih, "Economic preneur's innovative strategy in facing the economic crisis," *IAIC Transactions on Sustainable Digital Innovation (ITSDI)*, vol. 5, no. 2, pp. 117–126, 2024.
- [31] S. Huang, S. Vigne, D. Yao, and X. Xu, "Climate risk analysis: Definitions, measurements, strategies, and sectoral impacts," *Journal of Economic Surveys*, vol. 39, no. 4, pp. 1795–1822, 2025.
- [32] O. T. Odesola and A. M. Adebisi, "Operational risks and operational performance—a cross-sectional analysis of deposit money banks," *Rajagiri Management Journal*, vol. 19, no. 4, pp. 230–251, 2025.
- [33] E. Dollan, B. D. K. Ramadhan *et al.*, "Assessing the outcomes of circular economy and waste management partnerships between indonesia and denmark," *IAIC Transactions on Sustainable Digital Innovation (ITSDI)*, vol. 5, no. 1, pp. 76–83, 2023.
- [34] J. D. Odhiambo, C. K. Murori, and C. E. Aringo, "Financial leverage and firm performance: An empirical review and analysis," *East African Finance Journal*, vol. 4, no. 1, pp. 25–35, 2025.
- [35] H. M. Ahmed, B. K. Hassan, and S. S. Sangawi, "Impact of investment decision, liquidity management, and leverage ratio on the value of manufacturing companies: Investment decision, liquidity management, and leverage ratio," *Academic Journal of International University of Erbil*, vol. 2, no. 03, pp. 263–274, 2025.
- [36] R. Feng, L. Ma, and D. Wu, "Esg performance and corporate innovation under the moderating effect of firm size," *International Review of Economics & Finance*, vol. 97, p. 103774, 2025.
- [37] A. Setyawati, F. S. Fidhyanti, A. Sugangga, and I. Rahman, "Effects of financial ratios on financial distress in property and real estate companies," *International Journal of Management Research and Economics*, vol. 3, no. 3, pp. 328–345, 2025.
- [38] D. Dumitrescu, N. Bobitan, A. F. Popa, D. N. Sahlian, and C. A. Stanila, "Signaling financial distress through z-scores and corporate governance compliance interplay: A random forest approach," *Electronics*, vol. 14, no. 11, p. 2151, 2025.
- [39] K. Ali, H. M. Arslan, M. Mubeen, H. Azeem, Z. Zhen-Yu, J. Yushi, and M. Miao, "From reporting to responsibility: investigating the influence of sustainability disclosure on earnings management," *Environment, development and sustainability*, vol. 27, no. 12, pp. 30 431–30 464, 2025.
- [40] M. Ismayanti, A. Jufri *et al.*, "Accrual-based earnings management under external pressure: Evidence from fast and pizza using the modified jones model," *Indonesian Journal Economic Review*, vol. 6, no. 2, pp. 999–1008, 2026.
- [41] I. Ndu and J. Sims, "Discretionary accrual earnings management in a sub-saharan african economy," *The Review of Black Political Economy*, vol. 52, no. 1, pp. 109–134, 2025.
- [42] N. Sarbinny and I. Setiadi, "The effect of good corporate governance, sustainability reporting, and profitability on firm value in the energy sector listed on the indonesia stock exchange for the 2020–2024 period," *MAR-Ekonomi: Jurnal Manajemen, Akuntansi Dan Rumpun Ilmu Ekonomi*, vol. 4, no. 02, pp. 96–107, 2026.
- [43] N. R. M. Putri and A. Fernanda, "The influence of capital structure on profitability: Panel regression analysis of indonesian state-owned enterprises in the energy and mining sector from 2019 to 2023," *International Journal of Quantitative Research and Modeling*, vol. 6, no. 3, pp. 323–333, 2025.
- [44] D. Firmansyah, D. P. Susetyo, A. Suryana, and D. Saepuloh, "Sales volume: Operational costs and promotion costs—panel data regression model analysis approach," 2025.
- [45] J. Suteja, A. Gunardi, E. S. Alghifari, A. A. Susiadi, A. S. Yulianti, and A. Lestari, "Investment decision and firm value: moderating effects of corporate social responsibility and profitability of non-financial sector companies on the indonesia stock exchange," *Journal of Risk and Financial Management*, vol. 16, no. 1, p. 40, 2023.
- [46] Á. Saiz-Sepulveda, A. M. Moreno-Adalid, I. M. Rodríguez-Iglesias, and H. E. Estrada-López, "High-quality capital and financial performance: a dynamic panel analysis of spanish systemic banks after basel iii," *The Journal of Risk Finance*, pp. 1–30, 2026.
- [47] G. Danupranata, A. T. Basuki, and G. R. Putri, "Evaluation of the profitability performance of regional development banks using panel regression: A study on four provinces in indonesia," *Neo Journal of*

- economy and social humanities*, vol. 4, no. 1, pp. 86–97, 2025.
- [48] R. Dahal and D. P. Dhungana, “Impact of credit risk management in profitability of commercial banks of nepal,” *Nepalese Journal of Economic Studies*, vol. 4, no. 1, pp. 28–44, 2025.
- [49] A. Fitriani and A. Bani, “The regional determinants and policy implications of rice production volatility in east nusa tenggara (evidence from fixed-effects panel data analysis),” *JIA (Jurnal Ilmiah Agribisnis): Jurnal Agribisnis dan Ilmu Sosial Ekonomi Pertanian*, vol. 10, no. 4, pp. 355–368, 2025.
- [50] G. Zournatzidou, K. Ragazou, G. Sklavos, and N. Sariannidis, “Examining the impact of environmental, social, and corporate governance factors on long-term financial stability of the european financial institutions: Dynamic panel data models with fixed effects,” *International Journal of Financial Studies*, vol. 13, no. 1, p. 3, 2025.
- [51] F. Utami, “Analyzing the relationship between economic indicators, demographics, and islamic bank assets in high-asset oic countries,” *EKONOMIKA SYARIAH: Journal of Economic Studies*, vol. 9, no. 1, pp. 88–102, 2025.
- [52] R. Rafiqoh, A. Viddy, T. K. Xin, L. M. Fook, and R. B. Ansar, “The effect of profitability, capital adequacy, and liquidity on stock prices in the banking industry,” *Jurnal Manajemen Bisnis*, vol. 13, no. 1, pp. 340–357, 2026.
- [53] Organisation for Economic Co-operation and Development, *Government Risk Management Approaches Used for Chemicals Management*, ser. OECD Series on Risk Management of Chemicals. Paris: OECD Publishing, 2022. [Online]. Available: <https://doi.org/10.1787/4c4de250-en>
-